REMARKS

Claims 1 and 4 have been amended to comply with 35 USC §112, second paragraph, and new claims 13-17 have been added. No new matter was added. Thus, claims 1, 4, 11-17 are pending. Arguments for the patentability of the claims over the prior art of record are presented. Accordingly, Applicants respectfully submit that the present application is in condition for allowance.

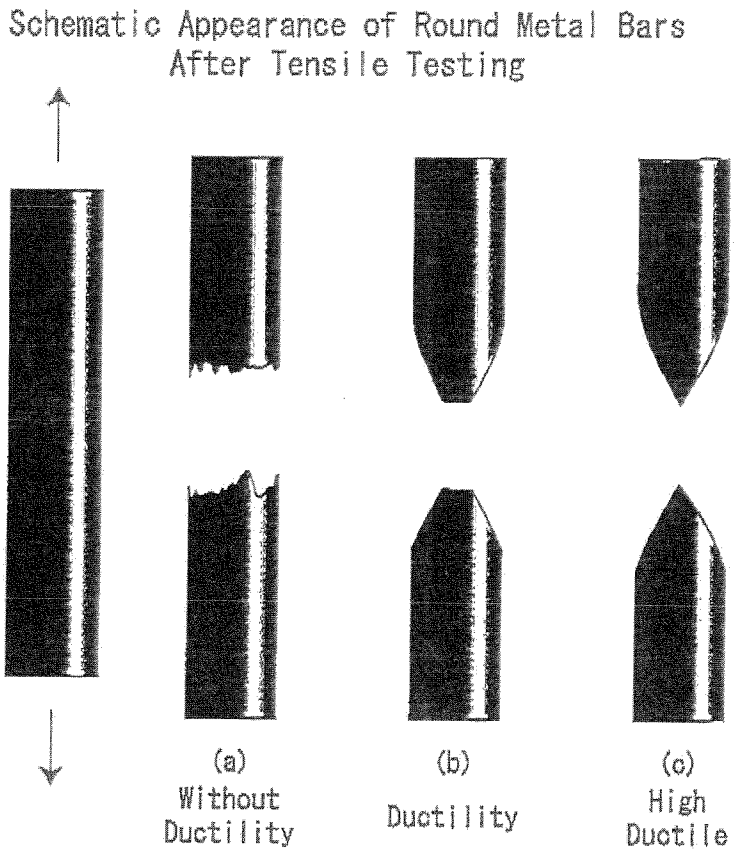
I. Claim Rejections - 35 USC §112, Second Paragraph

> *In the non-final Office Action dated November 12, 2008, claims 1, 4, 11 and 12 are rejected under 35 USC §112, second paragraph as being indefinite.*

Claims 1 and 4 have been amended to delete use of the word "few". In addition, claim 4 has been amended to replace the word "area" with "thickness". No new matter was added. Accordingly, Applicants respectfully submit that claims 1 and 4, as amended, and dependent claims 11 and 12 are in full compliance with the requirements of 35 USC §112, second paragraph.

Applicants respectfully submit that use of the word "area" was due to an improper translation of the International Application from Japanese to English. The specification of the present application makes clear that an amount of material is removed from the top face (i.e. face of the sputtering target subject to sputtering) by cutting using "lathe processing employing a bite (a cutting tool) or a chip". See page 6, lines 7-8, and page 7, line 18, of the present application, as filed. Also, see page 9, line 20, with respect to "the amount cut" with a lathe from the target of Comparative Example 1. Thus, according to the present invention, the lathe or cutting tool cuts, grinds or chips away the top of the sputtering target to remove 1mm to 10mm in depth or thickness of material from the top (i.e. sputtering) face of the target. No new matter was added.

With respect to the use of the words "ductile" and "ductility", Applicants respectfully submit that one of ordinary skill in the art recognizes that these are relative terms. For example, in the illustration provided below, one of ordinary skill in the art would define metal rod (a) as being "without ductility"; while one of ordinary skill in the art would define rod (b) as having ductility. In comparison, one of ordinary skill in the art would clearly define rod (c) as being "highly ductile".



Typically, sputtering targets are produced such that they have uniform composition and uniform structure. Sputtering targets having non-uniform compositions and/or structures are typically avoided due to the problems of "particles", "nodules" and "micro-arcing" discussed in detail on page 2, line 5, to page 3, line 6, of the present application, as filed.

However, the present invention is directed to a sputtering target that is specifically intended to have a non-uniform structure or microstructure. Particles of intermetallic compounds, oxides, carbides and carbonitrides (of an average particle diameter of at least 0.5 to 50μm or more) are mixed and suspended within a matrix phase of the target material. The matrix phase is highly ductile and can be easily cut. In fact, during polishing processing, the highly ductile matrix phase can actually "adhere" to the grindstone (see page 11, lines 3-6, of the present application, as filed). Unlike the matrix phase, the particles of intermetallic compounds, oxides, carbides and carbonitrides are not easily cut. These particles of intermetallic compounds, oxides, carbides and carbonitrides are without ductility and are clearly much less ductile than the matrix phase.

The problems created by the above references non-uniform structure (i.e., particles that are without ductility suspended in a highly ductile matrix phase) are clearly stated in the present application, as filed, on page 5, lines 18-25 (i.e., "defects", "dents", "cracks", "indentations", "fallouts", and "fragments"). Also see the problems stated with respect to Comparative Example 1 (page 9, lines 25-29), Comparative Example 2 (page 10, lines 7-11), and Comparative Example 3 (page 10, lines 19-23) of the present application, as filed. Also, due to the matrix phase being highly ductile, Comparative Example 4 which uses only polishing processing incurs a problem of the matrix phase "adhering to the grindstone" (page 11, lines 3-10).

Accordingly, the use of the phrases "without ductility" (with respect to the particles of intermetallic compounds, oxides, carbides and carbonitrides) and "highly ductile" (with respect to the matrix phase within which the particles are mixed and suspended) are for purposes of requiring the claimed sputtering target to have the above referenced non-uniform structure that is difficult to cut/polish without creating surface defects. The particles are individually suspended within and supported by the matrix phase, and the particles are less ductile than the matrix phase.

Thus, the particles are difficult to cut cleanly without creating defects, and the matrix phase is highly ductile and difficult to polish since it readily "adheres" to the grindstone. Applicants respectfully submit that one of ordinary skill in the art has a clear understanding of these phrases and their meaning as used in the claims 1 and 4 of the present application and that these phrases do particularly point out and distinctly claim the subject matter which Applicants regard as the invention in a definite manner. Therefore, Applicants respectfully submit that claims 1, 4, 11 and 12 are in full compliance with the requirements of 35 USC §112, second paragraph.

In addition to amendments, new claims 13-17 have been added. The phrase "and other substances without ductility" is not stated in these claims. The subject matter of the new claims is similar to that of claims 1 and 4. No new matter was added.

Applicants respectfully request reconsideration and removal of the rejections based on 35 USC §112, second paragraph.

II. Claim Rejections - 35 USC §103(a)

A. In the non-final Office Action dated November 12, 2008, claim 1 is rejected under 35 USC §103(a) as being obvious over JP 2002-069623 A.

As readily admitted by the Examiner, JP '623 is "drawn to a Co-Cr-Pt-B based sputtering target having a fine and uniform microstructure (Abstract)". Also, see Paragraph No. 0005 of JP '623 with respect to the objective of providing a Co-Cr-Pt-B system target that has a "detailed and uniform organization".

However, in some aspects, the disclosure provided by JP '623 has been misinterpreted. In the Office Action, it is stated that JP '623 teaches a Co-Cr-Pt-B target "providing dispersed boride precipitates in a Co-Cr-Pt-B matrix". This statement is inaccurate (the boride forms a continuous network and is not in the form of particles individually suspended within a matrix

phase). In addition, it is stated in the Office Action that "JP '623 teaches formation of a substantially identical product of a Co-Cr-Pt-B sputtering target". This statement is inaccurate (the structures of the targets are entirely different). Finally, the Office Action states that JP '623 does not disclose the existence of surface defects or the use of machine work that would create surface defects. Again, Applicants respectfully submit that this is inaccurate (the target of JP '623 is clearly required to be "sliced" or cut).

As discussed above, the sputtering target required by claim 1 of the present application has a non-uniform microstructure, not a "fine and uniform microstructure" disclosed by JP '623. The sputtering target of JP '623 has a continuous "network" of boride that defines "cells" of 200μm or less. See, for instance, Paragraph Nos. 0012-0017 of JP '623. The boride is a substance without ductility. However, in JP '623, the boride is not provided as particles mixed and suspended within a highly ductile matrix phase; rather, the boride forms a continuous network that defines cells of 200μm or less for non-boride material.

Thus, it is clear that the microstructure of the sputtering target of JP '623 is not "substantially identical" to that required by claim 1 of the present application. Claim 1 requires **particles** of intermetallic compounds, oxides, carbides, carbonitrides and other substances without ductility (having an average particle diameter of 0.5 to 50μm) mixed and suspended within a highly ductile matrix phase. Since particles without ductility are suspended in a highly ductile matrix phase, the sputtering target of the present application has a structure that is much more difficult to cut/polish without creating "defects", "dents", "cracks", "indentations", "fallouts", and "fragments" and without the highly ductile matrix phase "adhering" to the grindstone during polishing. Thus, the microstructures of claim 1 of the present application and the microstructure disclosed by JP '623 are entirely different.

Also, it should be noted that claim 1 requires the sputtering target to "contain" Co, Cr, Pt and B (i.e. open ended terminology) and that other elements can also be contained. It should also be noted that claim 1, as filed, requires intermetallic compounds, oxides, carbides, carbonitrides **and** other substances without ductility. Thus, the composition of the target of JP '623 and the present invention is also different. JP '623 merely discloses a network of boride by itself.

Finally, the sputtering target of JP '623 is subject to machine work and would certainly have surface defects, even if not noticed or commented on by the inventors of the JP '623 application. Paragraph No. 0006 of JP '623, when properly translated, states "... is poured in a cylindrical Fe mold, and the obtained ingot is sliced into a prescribed thickness ...". Thus, since the target is obtained by "slicing" a cast ingot and since "slicing" is typically accomplished via mechanical cutting with a wire saw or the like, the sputtering target of JP '623 is clearly required to be subject to "machine work". Accordingly, JP '623 cannot be said to be free from defects of 10μm or more resulting from machine work because JP '623 is subject to machine work and discloses no steps taken to prevent surface defects.

For all the reasons discussed above, Applicants respectfully request reconsideration and removal of the rejection of claim 1 as being obvious in view of JP '623. The microstructure required by claim 1 is significantly different than that disclosed by JP '623. In addition, JP '623 takes no steps to prevent or suppress surface defects, and one of ordinary skill in the art is provided with no teaching, suggestion, or disclosure of how to produce a target having the microstructure required by claim 1 of the present application such that it is free of surface defects. For example, even if JP '623 had the same microstructure as that of the present invention (which it does not), the sputtering target would be similar to that of Comparative Examples 1-3 of the present application which do not fall within the scope or obviate the limitations of claim 1 of the present application.

Accordingly, Applicants respectfully submit that claim 1 is patentable and is not obviated by the sputtering target disclosed in JP '623.

B. In the non-final Office Action dated November 12, 2008, claims 4 and 12 are rejected under 35 USC §103(a) as being obvious over JP 2002-069623 A in view of JP 2002-208125 A further in view of U.S. Patent No. 6,153,315 issued to Yamakoshi et al. and still further in view of U.S. Patent No. 5,460,793 issued to Kano et al.

The primary reference, JP '623, is discussed above in detail. In summary, it discloses a target having a completely different microstructure relative to the sputtering target required by claim 4 of the present application and fails to disclose any steps taken with respect to eliminating surface defects of a sputtering target having the claimed microstructure. By way of example, JP '623 discloses a fine and uniform sputtering target have a continuous uniform network formed of boride (a substance without ductility) which uniformly defines cells of 200μm or less. JP '623 clearly fails to disclose "particles" (0.5 to 50μm in average diameter) of a substance without ductility mixed and suspended within a highly ductile matrix phase. For obvious reasons, the sputtering target according to the present invention will be much more difficult to cut and polish relative to that disclosed by JP '623, and JP '623 provides no suggestion, teaching or disclosure to one of ordinary skill in the art of how to overcome the problems of surface defects with respect to a target having the claimed microstructure.

Accordingly, Applicants respectfully submit that the cited secondary references fail to overcome the deficiencies of the primary reference discussed above in detail and not previously considered by the Examiner. Thus, Applicants respectfully submit that for the same reasons that claim 1 is patentable and is not obviated by JP '623, claim 4 is patentable and not obviated by JP '623 in view of JP '125 further in view of Yamakoshi et al. and still further in view of the Kano et al. patent.

In addition, the secondary reference JP '125 merely discloses controlling the cutting tool feed speed of the cutting work via a lathe during a surface finish processing step for purposes of adjusting surface roughness (i.e., arithmetic-mean-roughness Ra). See Paragraph No. 0023 of JP '125. Thus, JP '125 clearly employs different surface processing than specifically required by the limitations of method claim 4 of the present application. Further, the technical concept taught by JP '125 is entirely different to that of the present invention. JP '125 is only concerned with controlling surface roughness (i.e., arithmetic-mean-roughness Ra) of the surface of the sputtering target and ignores "defects", "dents", "cracks", "indentations", "fallouts", and "fragments". Thus, unlike the present invention, JP '125 does not view surface defects as a problem and takes no steps to eliminate or suppress them.

Turning to the other references, Yamakoshi et al. and Kano et al., these references disclose sputtering targets formed of single phase material of titanium and silicide. These references clearly fail to disclose anything relative to a mixed phase material of a ductile material and a non-ductile material.

Further, none of these references discloses anything relative to the problems that are unique to a mixed phase material having particles without ductility suspended within a highly ductile matrix phase. Of course, these references also fail to disclose any solutions to such problems. Accordingly, Applicants respectfully submit that the inventive step of the present invention cannot be fairly denied based on JP '623 supplemented by the three cited secondary references.

Accordingly, Applicants respectfully request reconsideration and removal of the obviousness rejection of claims 4 and 12.

C. *In the non-final Office Action dated November 12, 2008, claim 11 is rejected under 35 USC §103(a) as being obvious over JP 2002-069623 A in view of JP 2002-208125 A further in view of U.S. Patent No. 6,153,315 issued to Yamakoshi et al. and still further in view of U.S. Patent No. 5,460,793 issued to Kano et al. and yet further in view of U.S. Patent No. 4,895,592 issued to Hatwar.*

Applicants respectfully submit that claim 11 is patentable and not obviated by JP '623 in view of JP '125, Yamakoshi et al., Kano et al., and Hatwar for the same reasons claim 1 is patentable over JP '623 and for the same reasons that claims 4 and 12 are patentable and not obvious over JP '623 in view of JP '125, Yamakoshi et al., and the Kano et al. patent. See arguments above.

Accordingly, Applicants respectfully request reconsideration and removal of the obviousness rejection of claim 11.

III. Conclusion

In view of the above amendments and remarks, Applicants respectfully submit that the claim rejections have been overcome and that the present application is in condition for allowance. Thus, a favorable action on the merits is therefore requested.

Please charge any deficiency or credit any overpayment for entering this Amendment to our deposit account no. 08-3040.

Respectfully submitted,
Howson & Howson LLP
Attorneys for Applicants

By /William Bak/
William Bak
Reg. No. 37,277
501 Office Center Drive
Suite 210
Fort Washington, PA 19034
(215) 540-9216